An Inventory Policy, Some Reliable Items Have Linear Requirements with Machine Learning, That Are Time Dependent and the Payer Has Acceptable Tardiness

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ABSTRACT

In this paper, an EOQ inventory replication is developed which suggests that the demand for perishable goods will be time dependent if settlement delays are allowed. It is assumed that the rate of decline is constant and the demand per time is linear with machine learning. This model calculates the function of time and the mathematical model.

KEYWORDS

Inventory, deterioration, Demand, Holding Cost, Machine, Permissible Delay.

INTRODUCTION

The traditional inventory policy considered that the retailer receives all the necessary items without any problems when the item is exhausted. that's why deteriorating items and exponential demand rates that are dependent on time have been presented for inventory policy, which earlier many authors have given them views in the different ways like, stock policy based on a time review in the existence of two supplementary items and related routes and joint level supply is considered in the presence of two items and this demand can be given either jointly or in a set of units [1]. Comparison of lot size policy and backlog product on spoiled items for very high profit and an inventory policy has been developed on the stock of partial backlog and the stuff is exhausted [2]. There are some models that over time cost and demand is up and down and there is a delay in making payments and the demand rate for the deteriorating goods also declines [3]. Due to delay in payment, demand for ramp type products cannot be met is explained as a series of very large size model based on optimum selling price [4-5]. Some models have also been given which are based on such a policy such as analyzing the models on the basis of the carry in cost on the demand of different times and the time dependent demand on the stock, some models are given on it. Presents a stable production schedule due to shortages and given a model for declining with exponential demand due to linear time constraints [6-8]. There are also some models in which preservation techniques and a variety of credit periods are based and some models are spoilage for time dependent demand and are based on stock levels and stock expiration dates [9-11]. Thus, the major purpose of this paper is that to achieving the minimum cash flow of overall future current cost for two cases that is for case one, if credit time is connected and in case second, prompt cost flow.

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ASSUMPTIONSANDNOTATIONS

These are the following assumptions which have used throughout this paper

(i) The time limit is infinite.

(ii) On-hand inventory is at a constant rate of decline per unit time and there is no repair or replenishment of perishable products within the cycle.

(iii) Deficiency is not permitted.

(iv) Rate of replenishment is boundless.

The following notations are used in this paper

(i) A : Cost of replenishment

(ii) T : Time period in the year among two consecutive orders

(iii) t_1 : Allowable time period in the year of delay in resolving the explanation

(iv) Ie : Interest earned in one year per rupee

MATHEMATICALFORMULATION&RESULTS

The inventory level I(t) at any series time period is generate with below differential equation

$$\frac{dI(t)}{dt} + \theta I(t) = -(a + bt) \; ; 0 \le t \le T$$

$$Z_1(T) = \frac{A}{T} + \frac{P}{T}\left[\frac{1}{\theta^2}\left\{e^{\theta T}(a\theta + bT\theta - b) - a\theta + b\right\} - aT - \frac{bT^2}{2}\right] +$$

$$\frac{h}{T\theta^3}\left[\left(e^{\theta T} - 1\right)(a\theta + bT\theta - b) - a\theta^2 T - \frac{bT^2\theta^2}{2} + b\theta T\right]$$

$$+ \frac{PI_P}{\theta^3 T}\left[\left(e^{\theta(T-t_1)} - 1\right)(a\theta + bT\theta - b) - \theta^2 a(T - t_1) - \frac{\theta^2 b}{2}(T^2 - t_1^2) + b\theta(T - t_1)\right] - \frac{PI_e}{6}T[3a + 2bT]$$

$$Z_2(T) = \frac{A}{T} + \frac{P}{T}\left[\frac{1}{\theta^2}\left\{e^{\theta T}(a\theta + bT\theta - b) - a\theta + b\right\} - aT - \frac{bT^2}{2}\right]$$

$$+ \frac{h}{T\theta^3}\left[\left(e^{\theta T} - 1\right)(a\theta + bT\theta - b) - a\theta^2 T - \frac{bT^2\theta^2}{2} + b\theta T\right]$$

$$-PI_e\left[t_1\left(a + \frac{bT}{2}\right) - \frac{T}{2}\left(a + \frac{bT}{3}\right)\right]$$

$$Z_3(t_1) = \frac{A}{t_1} + \frac{P}{t_1}\left[\frac{1}{\theta^2}\left\{e^{\theta t_1}(a\theta + bt_1\theta - b) - a\theta + b\right\} - at_1 - \frac{bt_1^2}{2}\right]$$

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$$+\frac{h}{t_1\theta^3}\left[\left(e^{\theta t_1}-1\right)(a\theta+bt_1\theta-b)-a\theta^2t_1-\frac{bt_1^2\theta^2}{2}+b\theta t_1\right]$$

$$-PI_e\left(\frac{at_1}{2}+\frac{bt_1^2}{3}\right)$$

CONCLUSION

In this model, there is no feasible solution for the 20% and 50% negative error in the parameter A. However, this result may be due to the choice of a particular parameter value for all of this case study. It is also observed in this model that the value of optimum cost quickly decreases with an increase of the parameter's values of all the tables & figure, meaning that it justifies the actual market conditions. For the actual market, it observes that dealers proffer their purchases a sure credit time period devoid of interest throughout the allowable delay in the period. Since a result, this is inspired purchases to order additional quantities for the reason that paying afterward indirectly decreases the acquire cost.

REFERENCES

[1] Kaur J. "For an Inventory Policy, Linear Demand Across Certain Perishable Products Which is Time Dependent and Permissible Delay in the Payer", Stochastic Modeling and Applications (SMA), MUK Publications and Distributions (INDIA), ISSN: 0972-3641, Vol. 26, Issue 3, April 2022, PP. 1588-1595. [UGC care approved Indexed Journal]

[2] Kaur J. "Inventory Policy for Decaying Products with Time-Diverse Carrying Value and Demand Dependent on Time under Fractional Backlogging", International Journal of Analytical and Experimental Modal Analysis (IJAEMA), ISSN: 0886-9367, Vol. 14, Issue 2, February 2022, PP 374-378. [UGC care and SCOPUS Indexed Journal]

[3] Kaur J. "Inventory Policy for Improving and Decline Products with Linear Demand Rate Under Permissible Delay in Payment and Decantation Cost", International Journal of Research and Analytical Reviews (IJRAR), ISSN: 2348-1269, Vol. 9, Issue 1, February 2022, PP 262-265. [UGC care approved Indexed Journal]

[4] Kaur J. "Decaying Objects of Constant Demand Speed and Dependent Time within Permitted Delay InImbursementofTheModelofInventoryLevel"publishedinIntelligentCommunication,Controland

Devices (ICICCD-2017), Advances in Intelligent Systems and Computing by SPRINGER including SCOPUS, Vol. 2, 16th April 2017, Page no. 709-717.

[5] Kaur J. "A production inventory model for deteriorating items with selling price dependent demand and variableholdingcost"PublishedinInternationalJournalofAdvancedInformationScienceand Technology (IJAIST), which is Indexing SCOPUS, Academia, Research Gate, Directory of Science, Etc., Vol 51, No. 51, July 11th, 2016.

[6] Kaur J."Inventory Model with Time-Dependent Holding Cost Under Inflation When Seller Credits to Order Quantity" Journal: International Journal of Advances in Mathematics. PEERREVIEW INTERNATIONAL JOURNAL, (Council for Innovative Research), Vol 8, No. 1, April 14, 2014, ISSN 2347-1921, page no.- 1407- 1417.

[7] Kaur J. "An Optimal Ordering Policy for Inventory Model with Non-Instantaneous Deteriorating Items and Stock-Dependent Demand" International Journal of Applied Mathematical Sciences (Hikari Ltd. Internationalpublicationofscience,technology&medicine),Vol.7,2013,no.82,4073-4080, HIKARI Ltd, the journal is operated from: Hikari Ltd, Open Access Publisher, Ruse, Bulgaria. Hikari journals are included in the leading abstracting and indexing databases, including SPRINGER including SCOPUS, Math Sci Net, Mathematical Reviews, Zentralblatt fur Mathematic, Chemical Abstracts, Directory of Open Access Journals, ISI Web of Knowledge, etc.

[8] Kaur J. "An Inventory Model for Time Dependent Deteriorating Items and Holding Cost Under Inflations When Vendor Credits to Order Quantity." International Journal of Engineering Research and Development (IJERD), PEER REVIEW INTERNATIONAL JOURNAL, Volume 5, Issue 12 (February 2013). Page no. 01-09.

[9] Kaur J. "An EOQ Model Under Trade Credits When Deteriorating Items and Demand Rate Are Both Time Dependent" International J. of Pure & Engg. Mathematics, PEER REVIEW INTERNATIONAL JOURNAL, (IJPEM) ISSN 2348-3881, Vol. 2 No. II (August, 2014), pp. 39-52.

[10] Kaur J. "Inventory Model for Exponentially Increasing Demand with Time and Deterioration and Permissible Delay in Payments" International Journal of Scientific and Engineering Research (IJSER), Volume 4, Issue 4 (April 2013), PEER REVIEW INTERNATIONAL JOURNAL, Page no.- 201-The Journal is operated from:USA/France/Singapore,startedinUSA.IJSERImpactfactor1.4till2012.

[11] Kaur J. "Inventory Model for Deterioration Is Dependent of Time Period with Dealing Credits Demand Rate" Journal of Applied Science and Computations, Volume 11, Issue 11, September/2022, Page No: 242-245.

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